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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/075,106	02/13/2002	John Robert Smith	H-204604	6949

7590 12/09/2002

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EXAMINER	
BAREFORD, KATHERINE A	
ART UNIT	PAPER NUMBER
1762	7

DATE MAILED: 12/09/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/075,106	SMITH ET AL.	
	Examiner	Art Unit	
	Katherine A. Bareford	1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 April 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☒ The proposed drawing correction filed on 4/8/02 is: a)☒ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 6 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Drawings

1. The corrected or substitute drawings were received on April 8, 2002. These drawings are approved.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1, lines 1-2, "light metal" is vague and indefinite as to what is required by a metal to be a "light metal". Applicant's specification, at page 4 (paragraph [0014]), provides examples of a lightweight metal (aluminum, magnesium or alloys thereof), but does not limit the "light metal" to these examples or provide any clarifying definition.

The other dependent claims do not cure the defects of the claims from which they depend.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted state of the prior art in view of Grylls et al (US 6485792), Lindblom (US 4687678) and Rabiei et al ("Microstructure, Deformation and Cracking Characteristics of Thermal Spray Ferrous Coatings" Article) (hereinafter Rabiei et al).

The admitted state of the prior art, at page 1 of the specification (see paragraph [0002]), teaches that it is known in the art to thermally spray coating onto a cylinder wall of an aluminum (light metal) engine block. A high velocity oxygen-fuel (HVOF) device is used. A jet of oxygen and gaseous fuel is ignited within an HVOF gun to melt a feed wire of ferrous-based material which is expelled from the gun by the jet of burning oxygen-fuel onto the surface of the cylinder wall.

The admitted state of the prior art teaches all the features of these claims except (1) the controlled oversupply of oxygen that reacts with the wire feed material to provide a supplemental source of heat (claim 1), (2) the additive material (claim 1), (3) the amount of oversupply (claim 2), (4) the addition of aluminum (claim 3), (5) the amount of aluminum (claims 4-5), and (6) the $FeAl_2O_4$ oxides (claim 6), (7) the amount of additive material (claim 7) and (8) the reactive features of the additive material (claims 8 ad 9).

However, Grylls teaches a thermal spraying process that uses an HVOF spraying process. See column 7, lines 10-35 and column 8,line 55 through column 9, line 10. Grylls teaches that

conventionally HVOF spraying processes occur with an excess of oxygen, which provides the hottest flame. See column 7, lines 10-35. However, this excess of oxygen can result in oxidation of the particles that form the coating. See column 7, lines 10-35.

Lindblom teaches thermal spraying a ferrous-based material (Fe Cr Al Y, for example). Column 1, lines 45-65 and column 2, lines 40-60. The coating can be improved by the deliberate formation of oxides in the coating material during thermal spraying. Column 1,lines 45-55. In this case, when plasma spraying, a controlled content of metal oxide in the coating can be varied by having more or less oxygen gas in the plasma. See column 2, lines 40-55. The coating material can contain the additive materials of aluminum and yttrium. See column 2, lines 40-60.

Rabiei et al provides a study of HVOF sprayed ferrous based coatings. See the Abstract. Rabiei et al teaches that ferrous based coatings are commonly used as protective bore coatings on aluminum alloy cylinder blocks, where the ferrous based material in the form of a wire is thermally sprayed onto the bore surface. See page152. The resultant coating is a composite of the alloy with oxides resulting from oxidation during deposition. See page 152. Rabiei analyzed a variety of such coatings. See page 155 and Table 1 (page 153). As shown by Table 1 and page 155, the materials are predominately Fe with small amounts of other materials, including various amounts of aluminum and various amounts of oxides. For example, 2.1 or 2.6 wt % aluminum can be present. Furthermore, ranges of 0.9 to 12 wt% oxides (of Fe and/or Al) can be present. See Table 1 and page 155. Also, magnesium can be present in an amount between 1.05 wt% and 0.01 wt %. Table 1. As well, silicon can be provided in small amounts. Table 1.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the admitted state of the prior art to provide a controlled oversupply of oxygen that reacts with the wire feed material to provide a supplemental source of heat as suggested by Grylls and Lindblom with an expectation of forming a desirable coating, because the admitted state of the prior art teaches that it is known to HVOF spray ferrous based coating materials onto a cylinder wall of a light metal engine block and Grylls teaches that when HVOF spraying it is conventionally known to provide an excess of oxygen that reacts with the feed material to form oxides, and Lindblom teaches that when thermal spraying a ferrous based material it is desirable to provide a controlled amount of oxygen to the material so as to form a desired amount of oxides in the resulting coating from when the oxygen reacts with the ferrous based material. As a result of these teachings, it would be suggested to provide a controlled excess amount of oxygen in the HOVF spraying of the admitted state of the prior art, so as to provide a beneficial ferrous based coating with a controlled amount of oxides. As a result of providing the controlled amount of excess oxygen, which reacts with the feed material to form oxides, this would provide the claimed combustion and resulting supplemental source of heat as claimed. As to the exact amount of oversupply of oxygen needed for optimum coating results, this would be a matter of routine experimentation, since Lindblom teaches the varying of the amount of oxygen to provide the desired amount of oxides. It would further have been obvious to one of ordinary skill in the art at the time the invention was made to modify the admitted state of the prior art in view of Grylls and Lindblom to provide magnesium and aluminum amounts and oxidesas suggested by Rabiei et al with an expectation of forming a desirable coating, because the admitted state of the prior art

in view of Grylls and Lindblom suggests HVOF spraying ferrous based materials onto cylinder bores with a controlled oversupply of oxygen so as to form a desirable amount of oxides in the resulting coating, and Rabiei et al teaches that a desirable ferrous based coating material for HVOF spraying cylinder bores can be formed so that the resulting coating has aluminum and/or magnesium and/or aluminum/iron oxides. For instance, Rabiei et al teaches that a desirable amount of aluminum can be 2.1 wt % (see material D) (reading on the amounts claimed in claims 4-5). Rabiei et al also teaches that when aluminum is present oxides of Fe and/or Al are formed, which would suggest the formation of $FeAl_2O_4$, since the reaction between oxygen, iron and aluminum would occur. As to the amounts of additive material, such as magnesium, Rabiei et al teaches that the magnesium can be present in amounts of less than 1 wt % (see Table 1). As to the reaction of the additive material with impurities in the coating/sulfur, it would have been obvious that such a reaction would occur as a matter of course, given that the references provide the claimed materials, oxygen and high temperatures of HVOF processes.

Double Patenting

6. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

7. Claims 1-9 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-3 and 5-10 of copending Application No. 10/022,322 in view of Rabiei et al.

The claims of 10/022,322 provide all the features of the above claims of the present application, such as the ferrous based wire and the HVOF spraying onto the cylinder block with an excess of oxygen, except for the additive material and their related effects/amounts.

However, Rabiei et al, as discussed in the 35 USC 103 rejection above, provides a study of HVOF sprayed ferrous based coatings. See the Abstract. Rabiei et al teaches that ferrous based coatings are commonly used as protective bore coatings on aluminum alloy cylinder blocks, where the ferrous based material in the form of a wire is thermally sprayed onto the bore surface. See page152. The resultant coating is a composite of the alloy with oxides resulting from oxidation during deposition. See page 152. Rabiei analyzed a variety of such coatings. See page 155 and Table 1 (page 153). As shown by Table 1 and page 155, the materials are predominately Fe with small amounts of other materials, including various amounts of aluminum and various amounts of oxides. For example, 2.1 or 2.6 wt % aluminum can be present. Furthermore, ranges of 0.9 to 12 wt% oxides (of Fe and/or Al) can be present. See Table 1 and page 155. Also, magnesium can be present in an amount between 1.05 wt% and 0.01 wt %. Table 1. As well, silicon can be provided in small amounts. Table 1.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify 10/022,322 to provide magnesium amounts as suggested by Rabiei et al with an expectation of forming a desirable coating, because 10/022,322 teaches HVOF spraying ferrous based materials (with an aluminum component) onto cylinder bores with a controlled oversupply of oxygen so as to form a desirable supplemental source of heat through reaction with the wire, and Rabiei et al teaches that a desirable ferrous based coating material for HVOF spraying cylinder bores can be formed so that the resulting coating also has aluminum and/or magnesium and/or aluminum/iron oxides. For instance, Rabiei et al teaches that magnesium can be present in amounts of less than 1 wt % (see Table 1). As to the reaction of the additive material with impurities in the coating/sulfur, it would have been obvious that such a reaction would occur as a matter of course, given that the references provide the claimed materials, oxygen and high temperatures of HVOF processes.

This is a provisional obviousness-type double patenting rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Katherine A. Bareford whose telephone number is (703) 308-0078. The examiner can normally be reached on M-F(7:00-4:30) First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive P. Beck can be reached on (703) 308-2333. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310~~9310~~ for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

KATHERINE A. BAREFORD
PRIMARY EXAMINER
GROUP ~~1100~~ 1700